INITIAL STATEMENT OF REASONS
FOR
PROPOSED BUILDING STANDARDS
OF THE
CALIFORNIA BUILDING STANDARDS COMMISSION
REGARDING THE
2007CALIFORNIA BUILDING CODE
CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 2, VOLUME 2

The Administrative Procedure Act (APA) requires that an Initial Statement of Reasons be available to the public upon request when a rulemaking action is being undertaken. The following information required by the APA pertains to this particular rulemaking action:

STATEMENT OF SPECIFIC PURPOSE AND RATIONALE:

The purpose of this proposed action is to update the 2007 California Building Code (2007 CBC) based on new information since the adoption of 2007 CBC.

CHAPTER 16-STRUCTURAL DESIGN

Section 1609.1.1 and 1609.6 - The all heights wind provisions of ASCE 7 are time consuming and confusing. Many engineers make significant errors in their use of this method. There is a simplified method in ASCE 7, but it is limited in use. SEAOC (Structural Engineers Association of California) have filed a petition with the California Building Standards Commission (CBSC) in accordance with California Code of Regulations (CCR) Title 24, Part 1: California Administrative Code, 2007 (CAC 2007) Article 1-8 to adopt an alternate method which is in full compliance with ASCE 7. This method is being considered by the ASCE 7 Wind Committee for adoption in ASCE 7-10 and have been approved by the International Code Council –Structural (ICC-S) Committee for incorporation into IBC 2009 pending final action. Adoption of this proposal in the California Building Code, 2007 (CBC 2007) will permit use of this simplified method in California starting in 2009 instead of 2011.

The derivation of this method from ASCE 7 Chapter 6 is as follows:
C_{net} values

$$q_z = 0.00256 \ K_z \ K_{zt} \ K_d \ V^2 \ I \qquad \text{Eqn 6-15}$$
$$p = q \ G \ C_p - q_i \ (GC_{pi}) \qquad \text{Eqn 6-17}$$

$$p = 0.00256 \ K_h \ K_{zt} \ K_d \ V^2 \ I \ G \ C_p - 0.00256 \ K_z \ K_{zt} \ K_d \ V^2 \ I \ (GC_{pi})$$

Rearranging terms:
$$p = (\ 0.00256 \ V^2 \ K_h \ K_d \ G \ C_p - 0.00256 \ V^2 \ K_z \ K_d \ (GC_{pi})) \ K_{zt} \ I$$

Define: $q_z = 0.00256 \ V^2$
so: $\qquad p = (q_s \ K_h \ K_d \ G \ C_p - q_s \ K_z \ K_d \ (GC_{pi})) \ K_{zt} \ I$
and: $\qquad p = q_s \ K_d \ (\ K_h \ G \ C_p - K_z \ (GC_{pi})) \ K_{zt} \ I$

For leeward wall and roof elements
$K_h = K_z$
so: $\qquad p = q_s \ K_z \ (\ K_d \ (G \ C_p - (GC_{pi}))) \ K_{zt} \ I$
Substitute $\qquad C_{net} = \ K_d \ (G \ C_p - (GC_{pi}))$
and we get: $\qquad p = q_s \ K_z \ C_{net} \ K_{zt} \ I$

which is Eqn. 16-36.
For windward roof elements
$K_h \approx K_z$ and the same relationship holds.

For buildings: $\qquad K_d = 0.85$
For rigid structures: $\qquad G = 0.85$
so: $C_{net} = 0.85 (0.85 C_p - (GC_{pi}))$

CHAPTER 16A-STRUCTURAL DESIGN

Section 1602A.1 – Definition of the term "Alternative System", which is widely used in the 2007 CBC and the 2006 International Building Code (2006 IBC) is being added to provide clarity.

Section 1609A.1.1 and 1609A.6 - The all heights wind provisions of ASCE 7 are time consuming and confusing. Many engineers make significant errors in their use of this method. There is a simplified method in ASCE 7, but it is limited in use. SEAOC (Structural Engineers Association of California) have filed a petition with the California Building Standards Commission (CBSC) in accordance with California Code of Regulations (CCR) Title 24, Part 1: California Administrative Code, 2007 (CAC 2007) Article 1-8 to adopt an alternate method which is in full compliance with ASCE 7. This method is being considered by the ASCE 7 Wind Committee for adoption in ASCE 7-10 and have been approved by the International Code Council –Structural (ICC-S) Committee for incorporation into IBC 2009 pending final action. Adoption of this proposal in the California Building Code, 2007 (CBC 2007) will permit use of this simplified method in California starting in 2009 instead of 2011.

The derivation of this method from ASCE 7 Chapter 6 is as follows:
C_{net} values
$q_z = 0.00256 K_z K_{zt} K_d V^2 I$ $\qquad$ Eqn 6-15
$p = q G C_p - q_i (GC_{pi})$ $\qquad$ Eqn 6-17

$p = 0.00256 K_h K_{zt} K_d V^2 I G C_p - 0.00256 K_z K_{zt} K_d V^2 I (GC_{pi})$

Rearranging terms:
$p = (0.00256 V^2 K_h K_d G C_p - 0.00256 V^2 K_z K_d (GC_{pi})) K_{zt} I$

Define: $q_z = 0.00256 V^2$
so: $\qquad p = (q_s K_h K_d G C_p - q_s K_z K_d (GC_{pi})) K_{zt} I$
and: $\qquad p = q_s K_d (K_h G C_p - K_z (GC_{pi})) K_{zt} I$

For leeward wall and roof elements
$K_h = K_z$
so: $\qquad p = q_s K_z (K_d (G C_p - (GC_{pi}))) K_{zt} I$
Substitute $\qquad C_{net} = K_d (G C_p - (GC_{pi}))$
and we get: $\qquad p = q_s K_z C_{net} K_{zt} I$

which is Eqn. 16A-36.
For windward roof elements
$K_h \approx K_z$ and the same relationship holds.

For buildings: $\qquad K_d = 0.85$
For rigid structures: $\qquad G = 0.85$
so: $C_{net} = 0.85 (0.85 C_p - (GC_{pi}))$

Sections 1614A.1.3 – Revision to commentary Section R2.2 in ACI 318-08 indicate that intermediate precast concrete shear walls will produce walls having minimum strength and toughness equivalent to ordinary reinforced concrete structural walls of cast-in-place concrete. ASCE 7-05 Table 12.2-1 prohibits the use of ordinary reinforced concrete shear walls in Seismic Design Categories D, E & F, because of low ductility and potential loss of structural integrity during design earthquake. Since intermediate precast concrete shear walls are equivalent to ordinary cast-in-place concrete walls, they are prohibited in this section.

Sections 1614A.1.7 & 1614A.1.17 – Results from Applied Technology Council (ATC) ATC - 63: "Qualification of Building System Performance and Response Parameters", indicate that buildings may fail at an unacceptable low seismic level if designed to American Society of Civil Engineers (ASCE) ASCE 7-05 minimum base shear requirements. ASCE 7-05 Supplement # 2, which is being adopted as part of this rulemaking, will mitigate this deficiency in the minimum base shear requirement.   The requirements of Sections 1614A.1.7 & 1614A.1.17, which used to address the same subject, are no longer necessary.

CHAPTER 19A-CONCRETE

Section 1917A.2 - American Concrete Institute (ACI) has created a new standard, ACI 503.7-07, "Specification for Crack Repair by Epoxy Injection", which provides guidance for the repair of cracks that intersect at least one accessible surface of concrete or masonry. Section 1917A.2 is added to adopt the new ACI 503.7-07 standards for crack repairs, thereby, eliminating the need for design criteria for concrete and masonry repairs.

CHAPTER 35 – REFERENCED STANDARDS

Supplements to ~~two~~ referenced standards~~,~~ ASCE 7-05 ~~and ASCE 41-06~~, that have been issued since the adoption of 2007 CBC is ~~are~~ being adopted in this chapter. Also, reference ~~to~~ standard ACI 503.7-07 is being adopted for crack repair by epoxy injection for concrete and masonry.

APPENDIX CHAPTER 1-ADMINISTRATION

Section 104.11.4 – This section codifies the current OSHPD practice of requiring earthquake monitoring instruments, when using an alternative Lateral Force Resisting System (LFRS), based on recommendation of the Hospital Building Safety Board (HBSB). This is a clarification of the requirement in Appendix Chapter 1 Section 104.11 as currently interpreted by OSHPD and not a new requirement. Alternative LFRS are not addressed or only partially addressed in the 2007 CBC, hence require considerable engineering judgment by engineering community and the enforcement agency. Since the performance of these systems are not fully documented, earthquake instrumentation to monitor their future performance is desirable.

TECHNICAL, THEORETICAL, AND EMPIRICAL STUDY, REPORT, OR SIMILAR DOCUMENTS:

- ASCE 7-05 "Minimum Design Loads for Buildings and Other Structures"
- ~~ASCE 41-06 "Seismic Rehabilitation of Existing Buildings"~~
- ACI 318-08 "Building Code Requirements for Structural Concrete and Commentary"
- ACI 503.7-07 "Specification for Crack Repair by Epoxy Injection"

CONSIDERATION OF REASONALBLE ALTERNATIVES

The alternative to these proposed regulations would be to leave regulations as they are. The alternative was rejected, since it would leave design requirements that are outdated from the current national standards.

REASONABLE ALTERNATIVES THE AGENCY HAS IDENTIFIED THAT WOULD LESSEN ANY ADVERSE IMPACT ON SMALL BUSINESS.

There will be no overall adverse cost impact on small business.

FACTS, EVIDENCE, DOCUMENTS, TESTIMONY, OR OTHER EVIDENCE OF NO SIGNIFICANT ADVERSE IMPACT ON BUSINESS.

The regulations proposed will have no overall cost impact on business, since they are equivalent to current requirements in the Code.

DUPLICATION OR CONFLICTS WITH FEDERAL REGULATIONS

These regulations do not duplicate or conflict with federal regulations.